REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated June 9, 2003. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 1, 3-5, 8, 10-19, 21-27 and 29-31 are under consideration in this application. Claims 1, 8, 17 and 26 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicants' invention. A new claim 31 is being added to recite another embodiment of the invention described in the specification.

Additional Amendments

The claims are being amended to correct formal errors and/or to better disclose or describe the features of the present invention as claimed. All the amendments to the claims are supported by the specification. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

Claim 1 was rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,132,685 to Kercso et al. (hereinafter "Kercso"). Furthermore, claims 1, 3-5, 8, 10-19, 21-24, 26-30 were rejected under 35 U.S.C. § 103(a) as being unpatenable U.S. Pat. No. 6,284,459 to Nova et al. (hereinafter "Nova") in view of Kercso, claims 1, 3, 4, 8, 13, 14, 17-19, 21-24, 26 and 27 were further rejected under 35 U.S.C. 103(a) as being unpatenable over U.S. Pat. No. 5,968,728 to Perttunen et al. (hereinafter "Perttunen") in view of Kercso, and claim 25 was rejected as being unpatenable over Nova in view of Kercso in further view of U.S. Pat. No. 5,800,992 to Fodor et al (hereinafter "Fodor"). These rejections have been carefully considered, but are most respectfully traversed.

The biochip 10 according to the invention, as now recited in claim 1, comprises: a surface 11 spotted with a plurality of biopolymers 12 in a predetermined pattern of spot locations; a storage medium 13 or 33 stored with information of the biopolymers, wherein the storage medium stores information, said information comprising the spot locations, identity of the biopolymers spotted on each of said spot locations, and a **detected** amount of the biopolymers spotted on each of said spot locations ("*the inspection results are written in to the memory of the biochip*" page 12, line 2); and a looped antenna 33b. In particular, the storage medium is an **integrated circuit memory** (page 7, line 6; claim 28) connected to the looped antenna, the storage medium thereby being capable of reading/writing information in a non-contact state.

The invention, as now recited in claim 8, is directed to a method for using a biochip, comprising the steps of: (a) providing the biochip having a surface spotted with a plurality of biopolymers in a predetermined pattern of spot locations, a storage medium stored with information of the biopolymers, said information including the spot locations, identity of the biopolymers spotted on each of said spot locations, and a **detected** amount of the biopolymers spotted on each of said spot locations, and a looped antenna, the storage medium being an integrated circuit memory connected to the looped antenna, the storage medium thereby being capable of reading/writing information in a non-contact state; (b) applying a sample to the biochip to hybridize the plurality of biopolymers with the sample; (c) detecting each of said spot locations to determine an amount of biopolymers bound with the sample; and (d) storing on the storage medium of the biochip information of the amount of the biopolymers bound with the sample at each of said spot locations.

The invention, as now recited in claim 26, is directed to a method of manufacturing a biochip, comprising the steps: providing a substrate having an integrated circuit memory and a looped antenna, the integrated circuit memory being connected to the looped antenna so as to be cable of reading/writing information in a non-contact state; spotting a plurality of biopolymers on a surface of the biochip in a predetermined pattern thereby providing spot locations thereon; and writing into the integrated circuit memory information of the spot locations, identity of the biopolymers, and a **detected** amount of the biopolymers spotted on each of said spot locations in a non-contact state.

In contrast, Kercso employs an optical bar code rather than an integrated circuit memory as does the invention.

Further more, Applicants respectfully contend that none of the cited prior art references or their combination as relied upon by the Examiner, teaches or suggests "a storage medium of a biochip stored with an amount of the biopolymers spotted on each of the spot locations (page 10, line 10; page 12, lines 15-20; page 12, lines 7-14)". The **detected** amount of spotted biopolymers on ***each spot*** ("*detect the amount of DNA spotted onto each spot*" page 12, line 15-20) is obtained via a inspecting step (Fig. 7; page 11, last paragraph continuing to page 12) by detecting fluorescent intensity with a CCD camera 71 (page 12, line 4) or a phase contrast microscope (page 13, line 4). The detected amount of *spotted biopolymers* on *each spot* is then used to **normalize** (page 14, 2nd paragraph) the detected amount of the *biopolymers hybridized with the sample* ("fluorescent-labeled sample DNA 82" page 13, lines 8-9 and last paragraph). The information concerning the amount of biopolymers is used for data normalization so as to contribute to the obtainment of accurate experiment results (page 14, lines 7-14; page 17, line 21-page 18 line 1 of the specification).

Each biopolymer spotted on each spot location of the surface of the biochip hybridizes with a complementary DNA in a sample to capture the complementary DNA at the spot location (page 13, line 10). When there are variations in the actually spotted amounts of the biopolymers on different spots, it is impossible to tell how much of deviation among the amounts of complementary DNAs captured of different spots is attributable to the differences (significant information) in the amount of samples hybridized with the biopolymers among different spots, since there are differences (experimental errors) in the actually spotted amounts of the biopolymers on the spots. This is a major reason why experiments using biochips could not conventionally provide high reliability. However, according to the present invention, the biochip possesses information concerning the **detected** amount of the biopolymers spotted on each location of the biochip. Thus, even if there are variations in the actually spotted amounts, they can be corrected so that accurate experiment results can be obtained. Accordingly, the present invention solves one major problem pertaining to biochips. Such a unique problem of a biochip is not disclosed in any of the cited references. Therefore, the present invention cannot be derived by combining the cited references in any way.

Col. 8, lines 23-38 of Kercso was relied upon by the Examiner to teach a storage medium of a biochip stored with an amount of the biopolymers spotted on each of the spot locations. However, Applicants respectfully contend that one skilled in the art will interpret, at best, "the

quantity information of the sample(s)" *before tests* (as *sample specific information*) in Kercso as a **spotting** amount of sample(s), rather than a **detected/actually spotted** amount of any spotted biopolymers, since Kercso does not teach or suggest any detecting step or mechanism. As to "the number or format of samples in the array" in Kercso, it is *test specific information* which concerns the sample information *after tests*. This has nothing to do with any actually spotted amounts of biopolymers on different spots before test/hybridization.

Kercso either uses "*a single pipettor*" or "*a plurality of pipettors for simultaneously injecting and processing samples in parallel assay channels* (col. 11, lines 51-55)." Like the prior art, using a single pipettor causes spotting errors in different spots due to un-evenly spotting, while using a plurality of pipettors also causes spotting errors in different spots due to un-evenly spotting among the pipettors. Kercso simply does not concern or try to solve the unique problem of a biochip as the invention, i.e., unequally spotted amounts of biopolymers on different spots before test/hybridization, as discussed.

> *Bar code reader station 22 includes an optical bar code reader oriented towards a back edge of plates 12. The bar codes disposed on the back edge of plates 12 may provide information regarding the specific samples contained in the wells of the plates, or may alternatively comprise a plate identifier so that the sample and/or test parameters are retrieved from a look-up table by the processor. A sample's data might include any or all of the identity of the sample compounds, the* ***quantity****, purity, source, or other sample specific information, or may provide test specific information regarding dilution ratios, reaction times, the* ***number or format of samples in the array****, or the like. A wide variety of alternative sample management stations may be provided instead of or in addition to bar code reader 22, before and/or after each reaction or test station.*

As admitted by the Examiner (page 4, 4th to 5th lines from the bottom; page 10, lines 9-10 in paragraph 8; page 13, lines 12-13 of the outstanding office action), none of the cited prior art references compensates for Kercso's deficiencies regarding a storage medium of a biochip stored with an amount of the biopolymers spotted on each of the spot locations.

Applicants contend that none of the prior art references or their combination teaches or discloses each and every feature of the present invention as disclosed in independent claims 1,

8 and 26. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

Respectfully submitted,

Stanley P. Fisher
Registration Number 24,344

Juan Carlos A. Marquez
Registration Number 34,072

REED SMITH LLP
3110 Fairview Park Drive, Suite 1400
Falls Church, Virginia 22042
(703) 641-4200

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